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Evaluating SAR for GSM/(E)GPRS Dual Transfer Mode

Class A GSM/(E)GPRS devices operate in Dual Transfer Mode (DTM) can transmit simultaneously using both circuit switched (CS) and packet switched (PS) connections according to the DTM multislot class (see 3GPP TS 43.055 and TS 45.001). Mobile stations operating in DTM configurations are required to have one allocated CS timeslot and additional PS slots for packet channel combinations. The total number of downlink and uplink time slots is defined by the DTM multislot class. DTM devices may operate according to earlier GSM requirements using two transceivers or the more recent 3GPP requirements using a single transceiver to transmit CS and PS data in consecutive timeslots within the same GSM frame. Furthermore, additional DTM multislot classes and enhanced DTM configurations have also been considered in recent and on-going revisions of the 3GPP/GSM requirements, which may require further considerations for SAR testing.

Regardless of whether DTM apples to a GSM/(E)GPRS device, operating parameters such as device Class, (E)GPRS multislot class, DTM multislot class and the maximum burst averaged conducted output power must be clearly identified in the SAR report to support the test configurations and measurement results. For Class A devices, the SAR evaluation must take into account the maximum CS and PS timeslots defined by the DTM multislot class of the device, with respect to head and/or body operating configurations and exposure conditions that require SAR evaluation.

SAR for DTM may be evaluated either with the device operating in DTM using one CS plus the maximum PS timeslots or by summing the single timeslot CS and multislot PS SAR. A communication testset with DTM support is necessary to configure the test device for DTM SAR measurements. Alternatively, the single slot CS GSM/GMSK voice-mode SAR for head and body-worn use should be added respectively to the PS (E)GPRS multislot data-mode SAR applicable to such head and body operating conditions to demonstrate SAR compliance for DTM[1]. Unless it is clearly explained in the SAR report that DTM is not feasible or does not apply in certain specific operating modes or exposure configurations, DTM SAR results for head and/or body are expected for Class A GSM/(E)GPRS devices to demonstrate SAR compliance.

The following must be clearly described and specified in the SAR report, before the SAR results, to identify the required test configurations:

1. Device class - A, B or C
2. (E)GPRS Multislot Class – indicate the maximum number of downlink, uplink and total timeslots per frame for GPRS and EGPRS

[1] Either summing the CS and PS 1-g SAR values or perform grid-by-grid summing using volume scan measurement procedures, typically applied to simultaneous transmission SAR measurements, to determine the aggregate 1-g SAR.

3. DTM Multislot Class – if Class A, indicate the maximum number of downlink, uplink and total timeslots per frame for DTM operations; i.e. CS and PS timeslots
4. The measured maximum burst averaged conducted output power for each operating mode –GMSK/8-PSK in CS/GSM and PS/(E)GPRS configurations
5. Descriptions of the test device and communication testset configurations used in the DTM SAR measurements or procedures applied to sum the DTM 1-g SAR for the required operating configurations and exposure conditions, with respect to the maximum measured burst averaged conducted output power and the maximum timeslots defined for the DTM multislot class of the device